DOCUMENT RESUME

ED 331 699 SE 051 470

AUTHOR Disinger, John F.
TITLE Teaching Creative Thinking through Environmental Education. ERIC/SMEAC Environmental Education Digest No. 3.
INSTITUTION ERIC Clearinghouse for Science, Mathematics, and Environmental Education, Columbus, Ohio.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
REPORT NO EDO-SE-90-33
PUB DATE 90
CONTRACT RI88062006
NOTE 3p.
AVAILABLE FROM ERIC/SMEAC, The Ohio State University, 1200 Chambers Road, Room 310, Columbus, OH 43212 ($1.50 single copy).
PUB TYPE Information Analyses - ERIC Clearinghouse Products (071)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Development; *Creative Thinking; Elementary Secondary Education; *Environmental Education; Literature Reviews; Science Education; *Science Instruction; Teaching Methods; *Thinking Skills
IDENTIFIERS ERIC Digests

ABSTRACT

Assisting students in the development of their ability to think has long been a basic goal of education. Creative thinking and critical thinking have been defined jointly as higher-order thinking based on fact and logic, insight and empathy; they are seen as necessary for problem solving, invention, and achievement. Because the primary goal of environmental education is typically described as the development of responsible environmental behavior, higher order thinking is needed. This digest focuses on the relationships between creative thinking and environmental education. Discussed are the behaviors involved in creative thinking, which disciplines are involved, and the curricular approaches which may be used. A list of 12 selected references is included. (CW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED331699

ERIC Clearinghouse for Science, Mathematics, and Environmental Education

1200 Chambers Road, Third Floor
Columbus, Ohio 43212
(614) 292-6717

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ERIC/SMEAC Environmental Education Digest EDO-SE-90-33 No. 3, 1990

TEACHING CREATIVE THINKING THROUGH ENVIRONMENTAL EDUCATION

For several decades, scholars and practitioners have agreed that education geared primarily toward the refinement of the rational powers (recalling and imagining, classifying and generalizing, comparing and evaluating, analyzing and synthesizing, deducing and inferring) is not sufficient preparation for life in a post-industrial society. Beginning in the middle of this century, initiatives in advertising triggered the identification of creativity and its elements as powers beyond the rational. Those early efforts have led to adaptations in education, as well as in business, industry, and government.

Assisting students in the development of their ability to think has long been identified as a basic goal of education. *Creative thinking* and *critical thinking* have been defined jointly as higher-order thinking based on fact and logic, insight and empathy; they are seen as necessary for problem-solving, invention, and achievement (Rosenblum-Cale, 1987). More precise definitions identify critical thinking as *convergent*, and creative thinking as *divergent*. Presselsen (1985) has characterized the understanding of particular meaning as the goal of critical thinking, and the creation of novel or aesthetic ideas and products as the goal of creative thinking. Finding solutions to specific problems and choosing from among identified alternatives both result from critical thinking, while identifying possible alternatives and making generalizations require creative thinking.

Because a primary goal of environmental education is typically described as the development of responsible environmental behavior (Ramsey and Hungerford, 1989), higher order thinking is needed. This digest focuses on relationships between creative thinking and environmental education. Critical thinking was the topic of a recent *ERIC/SMEAC Environmental Education Digest* (Howe and Warren, 1989).

What behaviors are involved in creative thinking?

Behaviors associated with creative thinking include fluency, metaphorical thinking, complexity, intuition, model making, insight, and imagery. "These are the behaviors of novelty and insight. We use them to create new thought patterns, unique products, and innovative solutions to problems. Because they are so idiosyncratic, they are difficult to define and reproduce" (Costa, 1985, p. 66).

Creative people actively seek problems and delight in the challenge of devising solutions. For most people, creativity is not inherent; it must be learned. Teachers need to develop their own creative talents before they can teach them to, and promote them in, their students. Guidelines for encouraging creativity in school settings have been outlined by Woolfolk and McCune-Nicolich (1984, p. 147):

1. Accept and encourage divergent thinking;
2. Tolerate dissent;
3. Encourage students to trust their own judgment;
4. Emphasize that everyone is capable of creativity in some form, and that creative feats are not necessarily superhuman accomplishments; and
5. Be a stimulus for creative thinking.

Curriculum organization that tends to fragment knowledge and place it in disciplinary compartments leads to analytical approaches to learning, "almost to the exclusion of strategies and skills of synthesis of information" (Roth, 1988, p.7). Although analytical approaches have been instrumental in the development of modern science, in educational settings they are likely to discount the value of creative thinking. But analytical thought is not sufficient for environmental learning, which also requires intuition, conviction, confidence, intellectual leaps, and ability to exchange views with others. By accepting a goal of inducing changes in environmental behavior, educators become obligated to stress development of abilities to synthesize and evaluate data from across the spectrum of human knowledge, and to invent solutions and generalizations.

Which disciplines are involved?

The development of responsible environmental behavior demands inputs from many disciplines. Conceptual schemes describing the range of environmental education span the natural and social sciences, as well as some aspects of the humanities. As noted in *A Nation at Risk* (Gardner, 1983, pp. 10-11): "Knowledge of the humanities must be harnessed to science and technology if the latter are to remain creative and humane, just as the humanities must be informed by science and technology if they are to remain relevant to the human condition."

Because environmental learning cannot be conveniently subsumed totally by any school subject, and because its specific components are identifiable as elements of one or another of the defined disciplines, it presents a special problem for educators: how to deal with "something" that includes "everything." When viewed from a discipline-oriented perspective, the problem seems insurmountable–too much content, too unwieldy, impossible to deal with in a rigorous fashion.

An implicit assumption of disciplinary philosophies is that students will be able to perform their own syntheses when it becomes necessary to do so, by drawing as needed on their learnings from separate disciplines. But rarely do students receive instruction or have organized practice in developing syntheses and drawing generalizations about the environment. A discipline-

SE051470

BEST COPY AVAILABLE

oriented educational structure is not designed to provide such opportunities, and can do so only to the extent that purposeful effort is directed toward doing so.

What curricular approaches may be used?

A common approach to environmental education is to infuse environmental considerations into existing curricula (Charles, 1987), fitting them in where appropriate and convenient. These situations provide opportunities for developing creative thinking, because of possibilities for drawing upon other disciplines in seeking creative solutions to environmental concerns. However, the implementation of infusion is often difficult to accomplish because discipline-oriented curriculum designers and teachers are reluctant to venture into academic areas other than their own specialities. Other concerns are that infusion may adversely affect the rigor of the host subject, or that instructional time needed for the thorough understanding of specific details will be lost to topics perceived as not directly pertinent to the discipline at hand.

Some educators recommend inclusion of separate environmental courses in the curriculum (Robottom, 1987). Such courses demand creativity, because they place a premium on the divergent thinking needed to encourage the development of generalizations based on data from multiple sources and disciplines. They also demand creative teachers who are able and willing to go beyond their own disciplines.

Summary

Many techniques may be used to foster creative thinking in an environmental context, whether infused or taught separately. Storytelling is particularly useful, particularly with younger children (Brazeau, 1985). It may be used to teach history, culture, concepts, or value, stimulate imagination, learn new words, set a mood, encourage participation, and foster caring attitudes about the environment, and can provide opportunities for divergent thinking, and for integrating information from various disciplines. With older students, storytelling may lead to the development of case studies for similar purposes, often providing bases for "what if...?" considerations. Likewise, brainstorming, reflective writing, visualization, guided imagery, and symbolic drawing offer opportunities for creativity in environment-related contexts (Brown, 1988).

Opportunities for creative problem-solving abound in learning situations dealing with the environment. Technically achievable solutions to environmental problems lie within the domains of and are circumscribed by the realities of the natural and physical sciences. However, workable solutions are further defined by considerations from the social sciences and humanities. In confronting environmental problems, problem-solvers must be knowledgeable about—and accept the challenge of dealing with—the range of the disciplines. Further, they must understand and respect the interrelationships and interactions. Environmental education can provide opportunities for learning creatively, and learning how to think creatively, in terms of identifying alternatives, using multiple sources, designing novel approaches, and identifying real and potential impacts of various aspects of existing problems and potential solutions.

References

Brazeau, Martin. "Storytelling: An Underused Teaching Aid," *Journal of Outdoor Education,* 19: 23-24, 1985.

Brown, Michael, H. "Wilderness Vision Quest: A Journey of Transformation," Annual Conference, Association for Experimental Education, Carbondale, IL, 1988. ED 300 256.

Charles, Cheryl. "WholeEarth Learning: An Infused Approach to Education About the Environment," in *Trends and Issues in Environmental Education: EE in School Curricula,* pp. 11-16, John F. Disinger, ed., ERIC/SMEAC, Columbus, OH, 1987. ED 292 608.

Costa, Arthur L. "The Behaviors of Intelligence," in *Developing Minds: A Resource Book for Teaching Thinking,* pp. 66-68, Arthur L. Costa, ed., Association for Supervision and Curriculum Development, Alexandria, VA, 1985. ED 262 968.

Gardner, David P. *A Nation at Risk: The Imperative for Educational Reform,* U. S. Government Printing Office, Washington, DC, 1983. ED 226 006.

Howe, Robert W. and Charles Warren. "Teaching Critical Thinking through Environmental Education," *ERIC/SMEAC Environmental Education Digest No. 2,* 1989. SE 051 459.

Presselsen, Barbara Z. "Thinking Skills: Meanings and Models," in *Developing Minds: A Resource Book for Teaching Thinking,* pp. 43-48, Arthur L. Costa, ed., Association for Supervision and Curriculum Development, Alexandria, VA, 1985. ED 262 968.

Ramsey, John M., and Hungerford, Harold R. "The Effects of Issue Investigation and Action Training on Environmental Behavior in Seventh Grade Students," *Journal of Environmental Education,* 20(4): 29-34, 1989.

Robottom, Ian. "Beyond Infusion and Single Subjects: The Issue of Fit of Environmental Education in the Curriculum," in *Trends and Issues in Environmental Education: EE in School Curricula,* pp. 85-92, John F. Disinger, ed., ERIC/SMEAC, Columbus, OH, 1987. ED 292 608.

Rosenblum-Cale, Karen. *Teaching Thinking Skills: Social Studies. Building Students' Thinking Skills Series.* National Education Association, Washington, DC, 1987. ED 310 962.

Roth, Charles E. "The Endangered Phoenix—Lessons from the Firepit," *Journal of Environmental Education* 19(3): 3-9, 1988.

Woolfolk, Anita E., and Lorraine McCune-Nicolich. *Educational Psychology for Teachers,* 2nd ed., Prentice-Hall, Englewood Cliffs, NJ, 1984.

Prepared by
John F. Disinger
Associate Director,
Environmental Education

This digest was funded by the Office of Educational Research and Improvement, U.S. Department of Education under contract no. RI-88062006. Opinions expressed in this digest do not necessarily reflect the positions or policies of OERI or the Department of Education.